

Original Research Article

Clinico-epidemiological profile of severe acute malnutrition in infants below 6 months

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ABSTRACT

Background: Severe acute malnutrition (SAM) is major public health burden, leading to significant morbidity and mortality. Early intervention during the first 1000 days of life is critical for influencing long-term health outcomes. This thesis aims to study clinico-epidemiological profile of SAM in infants under six months of age and to evaluate the outcomes after receiving facility-based care at NRC.

Methods: The study is an observational prospective longitudinal study done in NRC of LLR Hospital, Kanpur including infants less than 6 months of age with SAM.

Results: Out of 204 patients enrolled in the study, maximum percentage of patients were less than 2 months old. Male to female ratio was 1.27:1. SAM was more prevalent in infants with mixed feeding than Exclusive Breastfeeding. Low birth weight and the gestational age were associated with the occurrence of SAM. Other risk factors such as maternal illiteracy and family size were noted. Infants most commonly presented with lethargy followed by diarrhoea with dehydration and fever. Re-lactation was established in 56.7% of infants through Supplementary Suckling Technique (SST). Percentage of defaulters were 2% and death rate during NRC stay was 0.9%. 95% were discharged successfully from NRC, 66.9% were declared completely cured from NRC program on various follow up visits. 0.9% expired during the hospital stay and 2.9% infants expired after discharge.

Conclusions: Lack of exclusive breastfeeding, inappropriate feeding practices, low birth weight, maternal illiteracy, increased family size are the common risk factors for SAM. Proper counselling of the mother can help in improving exclusive breastfeeding rate.

Keywords: Severe acute malnutrition below 6 months, Exclusive breastfeeding, Supplementary suckling technique

INTRODUCTION

Severe acute malnutrition (SAM) is a major public health burden worldwide. Severely malnourished children have a high mortality rate. Optimal management of these acutely ill children is required on urgent basis in critical care, nutritional therapy followed by nutritional rehabilitation. Globally around 4 million infants under 6 months of age are severely wasted Kerac et al.¹ Initially the guidelines were for SAM from 6 months to 59 months, however after the NHM 2013 guidelines infants under 6 months were also included. According to NFHS-

4, in India the prevalence of SAM in infants below 6 months is 14.8% varying from 3.5 to 21% across different states.² Severe wasting in infants less than 6 months has received less attention. The first 1000 days of life i.e. from conception to approximately 2 years of age, is considered as golden opportunity to influence the child's outcome with short- and long-term effects on health of the infant and the young children.³ Initial 6 months of life represents the transition from neonatal phase to childhood phase. Environmental factors and nutrition during this period can have positive effect on baby's growth, brain development, metabolism and immune system.

As per world health organization (WHO), SAM under 6 months of age is defined as follows: Weight for length less than -3SD score and/or oedema of nutritional origin.⁴

MUAC is not taken as criteria to diagnose SAM under 6 months of age as per WHO guidelines because of lack of data on its reliability, measurement practices and predictive value for death.

The complications and coexisting infections in infants with SAM put them at risk of death from hypoglycemia, hypothermia, electrolyte imbalance, diarrhoea and pneumonia. Since exclusive breastfeeding for first 6 months of life is the only nutrition for the baby, therefore in addition to SAM management, SST is a cornerstone in establishing re-lactation in mothers who experience lactational failure.

Primary aim was to study the clinico-epidemiological profile of SAM in infants under six months of age and the secondary aim was to evaluate the outcomes after receiving facility-based care at nutrition rehabilitation centre (NRC).

METHODS

The present prospective observational longitudinal study was done in NRC of LLR hospital, Kanpur over a duration of 18 months (from December 2022 to June 2024). Infants less than 6 months of age affected with SAM were included in the study. Infants with congenital anomalies, chronic systemic illness and parents not consenting were excluded. Detailed medical, developmental, nutritional and other relevant history and physical examination findings were recorded with emphasis on the associated complications. Anthropometric measurements such as weight, length, occipito-frontal circumference, chest circumference were recorded using standard techniques.

Upon admission investigations such as Complete Blood Count, Urine routine and microscopy, HIV test, Montoux test, Chest X-ray, Blood and urine culture, Gastric aspirate for CBNAAT when indicated were done. All children admitted with SAM were treated as per NHM guidelines.⁵ Infants were weighed daily and were assessed for signs of recovery. Persistence of any problem or development of complications were managed appropriately.

SST was attempted in mothers with lactational failure and ongoing counselling regarding the same was done. The infants were considered for discharge when all medical complications got resolved, infants had good appetite and were clinically well and alert, had weight gain for three successive days (>20 g/day or >5 g/kg/day), immunization status was updated and the caretaker had been sensitized and educated about feeding practices. Parents/care takers were sensitized for nutritional management at home and follow-up schedule was

discussed with them which was fortnightly from the date of discharge for 2 months, or till weight for length reached >-2 SD as per the WHO standards.

Additionally telephonic communication with the family 2-3 days prior to scheduled follow-up visit was made as a reminder and to ensure compliance. At each follow-up visit; weight, length, weight for length were recorded and relevant history and physical examination were done to assess morbidities. They were managed for the same and visits were made more frequent until issues got resolved. Patients who had a relapse or developed complications on any follow-up visit were advised for readmission.

Various outcome at the time of discharge were-discharge (infants who were successfully discharged from NRC), Defaulter (infants who did not complete their NRC stay period and went LAMA), Death (Infants who expired during the hospital stay).

Outcomes during follow-up were defined as-cured (infants who were successfully discharged from NRC programme and also completed the target of >-2 SD during the follow-up), relapse/readmission, lost to follow-up and death. In addition, duration of stay for each infant was noted as one of the outcomes. The data derived was entered into Microsoft excel spread sheet with office 365 and analysed using SPSS version 26.

RESULTS

Out of 204 patients enrolled in the study, maximum of patients were less than 2 months old followed by 2 to 4 months and 4 to 6 months (Table 1). Male to female ratio was 1.27:1. SAM was more prevalent in large family size and in infants with mixed feeding. Low birth weight (81.9%) and not the gestational age (24% in preterm and 76% in term babies) was associated with the occurrence of SAM. 36.7% of illiterate, 32.8% of primary and secondary school educated and 30.5% of high school educated mothers had SAM infants (Table 1).

Infants most commonly presented with lethargy (58.8%), diarrhoea with dehydration (44.6%), fever (33.7%), sepsis (5.9%), pneumonia (17.4%) and hypothermia in 14.5% (Table 2).

Lactation was re-established in 56.7% of infants through SST. Performance indicators as per NRC program showed, average weight gain of 13.75 g/kg/day, average length of hospital stay of 13 days, 2% were defaulters and 0.9% died before discharge. Overall outcome of 204 patients was as follows: 194 (95%) were discharged successfully from NRC, 66.9% (n=136) were declared completely cured from NRC program after various follow-up visits; 15 infants (7.3%) experienced relapses/readmissions; 3.9% (n=8) were defaulters; 37 infants (18.3%) never came for follow-up, 2 infants (0.9%) expired during the hospital stay and 6 (2.9%) infants expired (Table 3).

Table 1: Risk factors associated with SAM under 6 months.

Infants' variables	N	Percentage (%)
Age at presentation (in months)		
Parameters	204	
0-2 months	76	37.3
2-4 months	74	36.3
4-6 months	54	26.5
Gender distribution		
Male	114	55.9
Female	90	44.1
Gestational age (in weeks)		
Preterm (<37 completed)	49	24
Term (>37 completed)	155	76
Birth weight (in kg)		
<2.5	167	81.9
>2.5	37	18.1
Maternal variables		
Maternal literacy, (n=204)		
Illiterate	75	36.7
Primary and middle school	67	32.8
High school or more	62	30.5
Type of feed		
Exclusive breast feeding	41	20.33
Mixed feeding	152	74.33
Family size (parent and children)		
≤4	81	39.8
>4	123	60.2

Table 2: Distribution according to presenting complaints, (n=204).

Clinical presentation	N	Percentage (%)
Fever	68	33.7
Lethargy	120	58.8
Diarrhea with dehydration	91	44.6
Septic shock	12	5.9
Fast breathing	35	17.4
Hypothermia (35°C/95°F)	30	14.5
Oedemata admission	0	0.0

Table 3: Final outcome in infants with SAM under 6 months of age, (n=204).

Outcome	N	Percentage (%)
Average weight gain	13.75 g/kg/day	-
Average length of stay in NRC	13 days	-
Re-establishment of breastfeeding using SST, n=89		
Lactation re-established	50	56.7
Lactation failure	39	43.5
During NRC stay, (n=204)		
Discharge	194	95
Defaulter	8	3.9
Death	2	0.9
After the discharge from NRC, n=194		
Cured from NRC program	136	66.9
Relapse/readmission	15	7.3
Never followed-up	37	18.13
Death	6	2.9

DISCUSSION

Infants less than 2 months were commonly affected followed by 2-4 months and 4-6 months. According to NFHS-4, SAM is more prevalent in less than one month of age as compared to those at five months of age.² Males more than females were affected with SAM with a ratio of 1.27:1. We observed that low birth weight babies and not the gestational age at birth was associated with SAM. Sharma and Das et al, Kumar et al and Chaudhary et al also found SAM to be more prevalent in LBW babies.^{2,6,7} This is because birth weight depends upon maternal nutrition during pregnancy and that quality of care for LBW and sick babies has after-effects on post-natal growth. SAM was more prevalent in infants on mixed feeding (74.33%) than exclusive breastfeeding (20.33%). The reason why 20.33% infants on exclusively breastfeeding developed SAM could be because maternal nutrition and stress can affect quality and quantity of breastmilk produced. Kankane et al, Sharma and Das et al and Chaudhary et al also found SAM to be more in infants with inappropriate feeding practices.^{6,8,9} Large family size was one of the risk factors for development of SAM in current study. It is likely due to increased competition of resources, reduced attention and care. Similar observations were made by Kadambari et al and Kumar et al.^{10,11} We found that SAM was equally prevalent in illiterate and literate mothers (middle and high school educated). The reason maternal literacy could not prevent SAM could be because of increased dependency on formula or animal milk and because of cultural practices.

Infants most commonly presented with lethargy (58.8%), diarrhoea with dehydration (44.6%), fever (33.7%), sepsis (5.9%), pneumonia (17.4%) and hypothermia in 14.5%. Singh et al in his study reported fever to be the most common presenting complaint (70%), followed by acute gastroenteritis in 50% of the patients.^{10,12} Kadambari et al reported cough, diarrhoea, fever, and sepsis as the main symptoms presented in infants below 6 months of age.¹⁰

Only 89 mothers committed for SST and the rest either did not consent for SST or had complete lactational failure, or were already on exclusive breastfeeding. In some of the cases, the primary care-giver was not the mother either due to her illness or who stayed back home to take care of other children. The 56% of these 89 mothers could successfully re-establishing lactation after SST. Similarly, 60.46% in Kanke et al, 50% in Singh et al and 80.6% in Baazab et al showed successful re-establishment of lactation underscoring the importance of carrying out SST in SAM children under 6 months of age.^{8,12,13}

Performance indicators as per NRC program showed, average weight gain of 13.75 g/kg/day, average length of hospital stay of 13 days, 2% were defaulters and 0.9% died before discharge. Overall outcome of 204 patients

was as follows: 194 (95%) were discharged successfully from NRC, 66.9% (n=136) were declared completely cured from NRC program on various follow-up visits; 15 infants (7.3%) experienced relapses/readmissions; 3.9% (n=8) were defaulters; 37 infants (18.3%) never came for follow-up, 2 infants (0.9%) expired during the hospital stay and 6 (2.9%) infants expired after discharge.

CONCLUSION

The study underscores the importance of LBW as a risk factor towards development of SAM <6 months than the preterm gestational age. Since mixed feeding and lack of exclusive breast feeding are a major contributory factor, it becomes imperative to include policy of "exclusive breastfeeding for first 6 months of life followed by complimentary feeding, as a vital part of preventive strategy." We need to develop novel ideas and programs to make this a reality. Our study also showed that SST is a simple, cost-effective, feasible technique with great success in re-establishing lactation in mothers who had issues related to breastfeeding and therefore should be practiced regularly in all NRC units. Our study's outcome testifies the validity of NHM guidelines for management of SAM under 6 months of age by demonstrating high discharge rate and less morbidity and mortality.

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